THE ASTROPHYSICAL JOURNAL

CONTENTS OF VOLUME 610, PART 1

2004 JULY 20, NUMBER 1


| | Page |
|---|---|
| HISTORY OF HYDROGEN REIONIZATION IN THE COLD DARK MATTER MODEL<br>*Christopher A. Onken & Jordi Miralda-Escudé* | 1 |
| REIONIZATION, SLOAN, AND *WMAP*: IS THE PICTURE CONSISTENT?<br>*Nickolay Y. Gnedin* | 9 |
| RADIATION HYDRODYNAMIC EVOLUTION OF PRIMORDIAL H II REGIONS ©<br>*Daniel Whalen, Tom Abel, & Michael L. Norman* | 14 |
| HIERARCHICAL FORMATION OF GALAXIES WITH DYNAMICAL RESPONSE TO SUPERNOVA-INDUCED GAS REMOVAL<br>*Masahiro Nagashima & Yuzuru Yoshii* | 23 |
| IS THERE A MISSING GALAXY PROBLEM AT HIGH REDSHIFT? ©<br>*Kentaro Nagamine, Renyue Cen, Lars Hernquist, Jeremiah P. Ostriker, & Volker Springel* | 45 |
| SPATIAL LOCALITY OF GALAXY CORRELATION FUNCTION IN PHASE SPACE: SAMPLES FROM THE 2MASS EXTENDED SOURCE CATALOG<br>*Yicheng Guo, Yao-Quan Chu, & Li-Zhi Fang* | 51 |
| INTERPRETING THE OBSERVED CLUSTERING OF RED GALAXIES AT $z \sim 3$<br>*Zheng Zheng* | 61 |
| TESTS FOR SUBSTRUCTURE IN GRAVITATIONAL LENSES<br>*C. S. Kochanek & N. Dalal* | 69 |
| THE COSMOLOGICAL EVOLUTION OF METAL ENRICHMENT IN QUASAR HOST GALAXIES<br>*Tiziana Di Matteo, Rupert A. C. Croft, Volker Springel, & Lars Hernquist* | 80 |
| THE BLACK HOLE MASS VERSUS VELOCITY DISPERSION RELATION IN QSOs/ACTIVE GALACTIC NUCLEI: OBSERVATIONAL APPEARANCE AND BLACK HOLE GROWTH<br>*Qingjuan Yu & Youjun Lu* | 93 |
| THE TRANSVERSE PROXIMITY EFFECT: A PROBE TO THE ENVIRONMENT, ANISOTROPY, AND MEGAYEAR VARIABILITY OF QSOs<br>*Michael Schirber, Jordi Miralda-Escudé, & Patrick McDonald* | 105 |
| REDSHIFTED 21 CENTIMETER SIGNATURES AROUND THE HIGHEST REDSHIFT QUASARS<br>*J. Stuart B. Wyithe & Abraham Loeb* | 117 |
| NEAR-INFRARED COLORS OF HARD X-RAY–SELECTED ACTIVE GALACTIC NUCLEI ©<br>*Chisato Watanabe, Kouji Ohta, Masayuki Akiyama, & Yoshihiro Ueda* | 128 |
| DUST AND GAS OBSCURATION IN ELAIS DEEP X-RAY SURVEY REDDENED QUASARS<br>*Chris J. Willott, Chris Simpson, Omar Almaini, Olivia Johnson, Andrew Lawrence, James S. Dunlop, Nathan D. Roche, Robert G. Mann, James C. Manners, Eduardo González-Solares, Ismael Pérez-Fournon, Rob J. Ivison, Stephen Serjeant, Seb J. Oliver, Richard G. McMahon, & Michael Rowan-Robinson* | 140 |
| EVIDENCE FOR MICROARCSECOND STRUCTURE IN THE BL LACERTAE OBJECT AO 0235+164<br>*B. Peng & A. G. de Bruyn* | 151 |
| OBSERVATION OF M87 AT 400 GeV WITH THE WHIPPLE 10 METER TELESCOPE<br>*S. Le Bohec, H. M. Badran, I. H. Bond, P. J. Boyle, S. M. Bradbury, J. H. Buckley, D. A. Carter-Lewis, M. Catanese, O. Celik, W. Cui, M. Daniel, M. D'Vali, I. de la Calle Perez, C. Duke, A. Falcone, D. J. Fegan, S. J. Fegan, J. P. Finley, L. F. Fortson, J. A. Gaidos, S. Gammell, K. Gibbs, G. H. Gillanders, J. Grube, J. Hall, T. A. Hall, D. Hanna, A. M. Hillas, J. Holder, D. Horan, A. Jarvis, M. Jordan, G. E. Kenny, M. Kertzman, D. Kieda, J. Kildea, J. Knapp, K. Kosack, H. Krawczynski, F. Krennrich, M. J. Lang, E. Linton, J. Lloyd-Evans, A. Milovanovic, P. Moriarty, D. Müller, T. Nagai, S. Nolan, R. A. Ong, R. Pallassini, D. Petry, B. Power-Mooney, J. Quinn, M. Quinn, K. Ragan, P. Rebillot, P. T. Reynolds, H. J. Rose, M. Schroedter, G. H. Sembroski, S. P. Swordy, A. Syson, V. V. Vassiliev, S. P. Wakely, G. Walker, T. C. Weekes, & J. Zweerink* | 156 |
| STRUCTURAL EVIDENCE FOR ENVIRONMENT-DRIVEN TRANSFORMATION OF THE BLUE GALAXIES IN LOCAL ABELL CLUSTERS: A85, A496, AND A754<br>*Daniel H. McIntosh, Hans-Walter Rix, & Nelson Caldwell* | 161 |

# CONTENTS


| | Page |
|---|---|
| *CHANDRA* OBSERVATIONS OF NGC 4438: AN ENVIRONMENTALLY DAMAGED GALAXY IN THE VIRGO CLUSTER<br>*Marie E. Machacek, Christine Jones, & William R. Forman* | 183 |
| A KECK/HIRES STUDY OF KINEMATICS OF THE COLD INTERSTELLAR MEDIUM IN DWARF STARBURST GALAXIES<br>*Colleen M. Schwartz & Crystal L. Martin* | 201 |
| DIFFUSE X-RAY EMISSION IN SPIRAL GALAXIES<br>*Krystal Tyler, A. C. Quillen, Amanda LaPage, & George H. Rieke* | 213 |
| WINDS DRIVEN BY SUPER STAR CLUSTERS: THE SELF-CONSISTENT RADIATIVE SOLUTION<br>*Sergey Silich, Guillermo Tenorio-Tagle, & Ary Rodríguez-González* | 226 |
| A POPULATION OF MASSIVE GLOBULAR CLUSTERS IN NGC 5128<br>*Paul Martini & Luis C. Ho* | 233 |
| SUPERSOFT X-RAY SOURCES IN M31. I. A *CHANDRA* SURVEY AND AN EXTENSION TO QUASI-SOFT SOURCES<br>*R. Di Stefano, A. K. H. Kong, J. Greiner, F. A. Primini, M. R. Garcia, P. Barmby, P. Massey, P. W. Hodge, B. F. Williams, S. S. Murray, S. Curry, & T. A. Russo* | 247 |
| SUPERSOFT X-RAY SOURCES IN M31. II. *ROSAT*-DETECTED SUPERSOFT SOURCES IN THE *ROSAT*, *CHANDRA*, AND *XMM-NEWTON* ERAS<br>*J. Greiner, R. Di Stefano, A. Kong, & F. Primini* | 261 |
| THE DISTANCE TO THE LARGE MAGELLANIC CLOUD CLUSTER RETICULUM FROM THE *K*-BAND PERIOD-LUMINOSITY-METALLICITY RELATION OF RR LYRAE STARS<br>*M. Dall'Ora, J. Storm, G. Bono, V. Ripepi, M. Monelli, V. Testa, G. Andreuzzi, R. Buonanno, F. Caputo, V. Castellani, C. E. Corsi, G. Marconi, M. Marconi, L. Pulone, & P. B. Stetson* | 269 |
| A *CHANDRA* VIEW OF THE MORPHOLOGICAL AND SPECTRAL EVOLUTION OF SUPERNOVA REMNANT 1987A<br>*Sangwook Park, Svetozar A. Zhekov, David N. Burrows, Gordon P. Garmire, & Richard McCray* | 275 |
| SHOCKED CLOUDS IN THE VELA SUPERNOVA REMNANT<br>*Joy S. Nichols & Jonathan D. Slavin* | 285 |
| DISCOVERY OF A DUSTY RING IN THE COALSACK: A DENSE CORE CAUGHT IN THE ACT OF FORMATION? Ⓔ<br>*Charles J. Lada, Tracy L. Huard, Lionel J. Crews, & João F. Alves* | 303 |
| DISCOVERY OF FOUR NEW MASSIVE AND DENSE COLD CORES<br>*Guido Garay, Santiago Faúndez, Diego Mardones, Leonardo Bronfman, Rolf Chini, & Lars-Åke Nyman* | 313 |
| ON THE RELATIVE ABUNDANCE OF $C^{18}O$ AND $C^{17}O$ IN THE TAURUS MOLECULAR CLOUD<br>*E. F. Ladd* | 320 |
| A 4–6 GHz SPECTRAL SCAN AND 8–10 GHz OBSERVATIONS OF THE DARK CLOUD TMC-1<br>*S. V. Kalenskii, V. I. Slysh, P. F. Goldsmith, & L. E. B. Johansson* | 329 |
| INITIAL IONIZATION OF COMPRESSIBLE TURBULENCE Ⓔ<br>*Yuexing Li, Mordecai-Mark Mac Low, & Tom Abel* | 339 |
| FREE-FREE SPECTRAL ENERGY DISTRIBUTIONS OF HIERARCHICALLY CLUMPED H II REGIONS<br>*Richard Ignace & Ed Churchwell* | 351 |
| QUIESCENT BURST EVIDENCE FOR TWO DISTINCT GAMMA-RAY BURST EMISSION COMPONENTS<br>*Jon Hakkila & Timothy W. Giblin* | 361 |
| WHITE DWARFS NEAR BLACK HOLES: A NEW PARADIGM FOR TYPE I SUPERNOVAE Ⓔ<br>*J. R. Wilson & G. J. Mathews* | 368 |
| SPECTRAL AND TIMING EVOLUTION OF THE BLACK HOLE X-RAY NOVA 4U 1543–47 DURING ITS 2002 OUTBURST<br>*S. Q. Park, J. M. Miller, J. E. McClintock, R. A. Remillard, J. A. Orosz, C. R. Shrader, R. W. Hunstead, D. Campbell-Wilson, C. H. Ishwara-Chandra, A. P. Rao, & M. P. Rupen* | 378 |
| LUMINOSITY-RELATED CHANGES IN THE CYCLOTRON RESONANCE STRUCTURE OF THE BINARY X-RAY PULSAR 4U 0115+63<br>*T. Mihara, K. Makishima, & F. Nagase* | 390 |
| SEPARATED AT BIRTH: THE ORIGIN OF THE PULSARS B2020+28 AND B2021+51 IN THE CYGNUS SUPERBUBBLE<br>*W. H. T. Vlemmings, J. M. Cordes, & S. Chatterjee* | 402 |
| THE RADIAL VELOCITY AND MASS OF THE WHITE DWARF OF EX HYDRAE MEASURED WITH *CHANDRA*<br>*R. Hoogerwerf, N. S. Brickhouse, & C. W. Mauche* | 411 |
| *CHANDRA* OBSERVATIONS OF V407 VULPECULAE: CONFIRMATION OF THE SPIN-UP<br>*Tod E. Strohmayer* | 416 |
| *CHANDRA* LOW ENERGY TRANSMISSION GRATING SPECTRUM OF SS CYGNI IN OUTBURST Ⓔ<br>*Christopher W. Mauche* | 422 |
| OBSERVATIONS OF WATER VAPOR OUTFLOW FROM NML CYGNUS Ⓔ<br>*Viktor Zubko, Di Li, Tanya Lim, Helmut Feuchtgruber, & Martin Harwit* | 427 |

# CONTENTS


| | Page |
|---|---|
| ON THE DRIVING MECHANISM AND THE COEXISTENCE OF VARIABLE AND NONVARIABLE STARS IN THE DOMAIN OF THE PULSATING PG 1159 STARS<br>*P.-O. Quirion, G. Fontaine, & P. Brassard* | 436 |
| THE VISUAL ORBITS OF THE SPECTROSCOPIC BINARIES HD 6118 AND HD 27483 FROM THE PALOMAR TESTBED INTERFEROMETER<br>*Maciej Konacki & Benjamin F. Lane* | 443 |
| CONVECTIVE COOLING OF PROTOPLANETARY DISKS AND RAPID GIANT PLANET FORMATION<br>*Alan P. Boss* | 456 |
| SPIN-ORBIT EVOLUTION OF SHORT-PERIOD PLANETS<br>*Ian Dobbs-Dixon, D. N. C. Lin, & Rosemary A. Mardling* | 464 |
| TIDAL DISSIPATION IN ROTATING GIANT PLANETS ©<br>*G. I. Ogilvie & D. N. C. Lin* | 477 |
| HEAVY-ELEMENT ABUNDANCES IN SOLAR ENERGETIC PARTICLE EVENTS<br>*D. V. Reames & C. K. Ng* | 510 |
| LOOP DENSITY ENHANCEMENT BY NONLINEAR MAGNETOHYDRODYNAMIC WAVES<br>*J. Terradas & L. Ofman* | 523 |
| ESTIMATION OF THE THREE-DIMENSIONAL SPACE SPEED OF A CORONAL MASS EJECTION USING METRIC RADIO DATA<br>*C. Kathiravan & R. Ramesh* | 532 |
| THE TRIGGER MECHANISM OF SOLAR FLARES IN A CORONAL ARCADE WITH REVERSED MAGNETIC SHEAR<br>*K. Kusano, T. Maeshiro, T. Yokoyama, & T. Sakurai* | 537 |
| STOCHASTIC ACCELERATION OF ELECTRONS AND PROTONS. I. ACCELERATION BY PARALLEL-PROPAGATING WAVES ©<br>*Vahé Petrosian & Siming Liu* | 550 |
| CHROMOSPHERIC WAVES OBSERVED IN THE He I SPECTRAL LINE ($\lambda$ = 10830 Å): A CLOSER LOOK<br>*Holly R. Gilbert & Thomas E. Holzer* | 572 |
| ERUPTION OF A BUOYANTLY EMERGING MAGNETIC FLUX ROPE<br>*W. Manchester IV, T. Gombosi, D. DeZeeuw, & Y. Fan* | 588 |
| LINEAR ANALYSIS AND NONLINEAR EVOLUTION OF TWO-DIMENSIONAL GLOBAL MAGNETOHYDRODYNAMIC INSTABILITIES IN A DIFFUSIVE TACHOCLINE<br>*Mausumi Dikpati, Paul S. Cally, & Peter A. Gilman* | 597 |
| LABORATORY MEASUREMENTS OF THE Fe XVII $2p-3s$ AND $2p-3d$ TRANSITIONS AND COMPARISON WITH SOLAR AND ASTROPHYSICAL OBSERVATIONS<br>*P. Beiersdorfer, M. Bitter, S. von Goeler, & K. W. Hill* | 616 |
| ADDENDUM: "*CHANDRA* X-RAY IMAGING AND SPECTROSCOPY OF THE M87 JET AND NUCLEUS" (ApJ, 568, 133 [2002])<br>*A. S. Wilson & Y. Yang* | 624 |


## 2004 AUGUST 1, NUMBER 2


| | |
|---|---|
| COMPASS: AN UPPER LIMIT ON COSMIC MICROWAVE BACKGROUND POLARIZATION AT AN ANGULAR SCALE OF 20′ ©<br>*Philip C. Farese, Gionjo Dall'Oglio, Joshua O. Gundersen, Brian G. Keating, Slade Klawikowski, Lloyd Knox, Alan Levy, Philip M. Lubin, Chris W. O'Dell, Alan Peel, Lucio Piccirillo, John Ruhl, & Peter T. Timbie* | 625 |
| LYMAN BREAK GALAXIES AT $z \sim 5$: REST-FRAME ULTRAVIOLET SPECTRA<br>*Masataka Ando, Kouji Ohta, Ikuru Iwata, Chisato Watanabe, Naoyuki Tamura, Masayuki Akiyama, & Kentaro Aoki* | 635 |
| IONIZING RADIATION FLUCTUATIONS AND LARGE-SCALE STRUCTURE IN THE Ly$\alpha$ FOREST ©<br>*Rupert A. C. Croft* | 642 |
| EFFECTS OF TRIAXIALITY ON THE STATISTICS OF LARGE-SEPARATION GRAVITATIONAL LENSES<br>*Masamune Oguri & Charles R. Keeton* | 663 |
| POSSIBILITY OF MAGNETIC MASS DETECTION BY THE NEXT GENERATION OF MICROLENSING EXPERIMENTS<br>*Sohrab Rahvar & Farhang Habibi* | 673 |
| MICROLENSING OF THE BROAD EMISSION LINE REGION IN THE QUADRUPLE LENS SDSS J1004+4112<br>*Gordon T. Richards, Charles R. Keeton, Bartosz Pindor, Joseph F. Hennawi, Patrick B. Hall, Edwin L. Turner, Naohisa Inada, Masamune Oguri, Shin-Ichi Ichikawa, Robert H. Becker, Michael D. Gregg, Richard L. White, J. Stuart B. Wyithe, Donald P. Schneider, David E. Johnston, Joshua A. Frieman, & J. Brinkmann* | 679 |

# CONTENTS


| | Page |
|---|---|
| DETECTION OF X-RAYS FROM GALAXY GROUPS ASSOCIATED WITH THE GRAVITATIONALLY LENSED SYSTEMS PG 1115+080 AND B1422+231<br>*C. E. Grant, M. W. Bautz, G. Chartas, & G. P. Garmire* | 686 |
| MICROLENSING CANDIDATES IN M87 AND THE VIRGO CLUSTER WITH THE *HUBBLE SPACE TELESCOPE*<br>*Edward A. Baltz, Tod R. Lauer, David R. Zurek, Paolo Gondolo, Michael M. Shara, Joseph Silk, & Stephen E. Zepf* | 691 |
| TIDAL DISRUPTION OF A STAR BY A BLACK HOLE: OBSERVATIONAL SIGNATURE<br>*Tamara Bogdanović, Michael Eracleous, Suvrath Mahadevan, Steinn Sigurdsson, & Pablo Laguna* | 707 |
| ACTIVE GALACTIC NUCLEI WITH CANDIDATE INTERMEDIATE-MASS BLACK HOLES<br>*Jenny E. Greene & Luis C. Ho* | 722 |
| *CHANDRA* OBSERVATIONS OF X-RAY–WEAK NARROW-LINE SEYFERT 1 GALAXIES<br>*Rik J. Williams, Smita Mathur, & Richard W. Pogge* | 737 |
| *K*-BAND PROPERTIES OF GALAXY CLUSTERS AND GROUPS: LUMINOSITY FUNCTION, RADIAL DISTRIBUTION, AND HALO OCCUPATION NUMBER ©<br>*Yen-Ting Lin, Joseph J. Mohr, & S. Adam Stanford* | 745 |
| A SOFT X-RAY EXCESS IN THE A754 CLUSTER<br>*Mark J. Henriksen, Daniel S. Hudson, & Eric Tittley* | 762 |
| THE NATURE OF RADIO CONTINUUM EMISSION IN THE DWARF STARBURST GALAXY NGC 625<br>*John M. Cannon & Evan D. Skillman* | 772 |
| MULTIFLUID, MAGNETOHYDRODYNAMIC SHOCK WAVES WITH GRAIN DYNAMICS. II. DUST AND THE CRITICAL SPEED FOR C SHOCKS<br>*Glenn E. Ciolek, Wayne G. Roberge, & Telemachos Ch. Mouschovias* | 781 |
| DUST HEATING BY THE INTERSTELLAR RADIATION FIELD IN MODELS OF TURBULENT MOLECULAR CLOUDS<br>*Thomas J. Bethell, Ellen G. Zweibel, Fabian Heitsch, & J. S. Mathis* | 801 |
| ON THE O II GROUND CONFIGURATION ENERGY LEVELS<br>*K. P. M. Blagrave & P. G. Martin* | 813 |
| THE SPATIAL ENERGY SPECTRUM OF MAGNETIC FIELDS IN OUR GALAXY<br>*J. L. Han, K. Ferriere, & R. N. Manchester* | 820 |
| IMAGING MWC 349 FROM 7 MILLIMETERS TO 90 CENTIMETERS<br>*D. Tafoya, Y. Gómez, & L. F. Rodríguez* | 827 |
| A VERY LARGE ARRAY SEARCH FOR WATER MASERS IN SIX H II REGIONS: TRACERS OF TRIGGERED LOW-MASS STAR FORMATION<br>*Kevin R. Healy, J. Jeff Hester, & Mark J. Claussen* | 835 |
| COSMIC-RAY ACCELERATION AT RELATIVISTIC SHOCK WAVES WITH A "REALISTIC" MAGNETIC FIELD STRUCTURE<br>*Jacek Niemiec & Micha Ostrowski* | 851 |
| GAMMA-RAY SPECTRA DUE TO COSMIC-RAY INTERACTIONS WITH DENSE GAS CLOUDS<br>*Michiko Ohishi, Masaki Mori, & Mark Walker* | 868 |
| COULD THERE BE A HOLE IN TYPE Ia SUPERNOVAE?<br>*Daniel Kasen, Peter Nugent, R. C. Thomas, & Lifan Wang* | 876 |
| ROLES OF SUPERNOVA EJECTA IN NUCLEOSYNTHESIS OF THE LIGHT ELEMENTS Li, Be, AND B<br>*Ko Nakamura & Toshikazu Shigeyama* | 888 |
| QUASI-PERIODIC INWARD SHOCK FORMATIONS IN THE SYSTEM OF A BLACK HOLE AND AN ACCRETION DISK AND APPLICATION TO QUASI-PERIODIC OSCILLATIONS IN GALACTIC BLACK HOLE CANDIDATES<br>*Seiichiro I. Aoki, Shinji Koide, Takahiro Kudoh, Kunji Nakayama, & Kazunari Shibata* | 897 |
| COLLAPSE OF UNIFORMLY ROTATING STARS TO BLACK HOLES AND THE FORMATION OF DISKS<br>*Stuart L. Shapiro* | 913 |
| THREE-DIMENSIONAL SIMULATIONS OF DISK ACCRETION TO AN INCLINED DIPOLE. II. HOT SPOTS AND VARIABILITY<br>*M. M. Romanova, G. V. Ustyugova, A. V. Koldoba, & R. V. E. Lovelace* | 920 |
| THE LOW QUIESCENT X-RAY LUMINOSITY OF THE NEUTRON STAR TRANSIENT XTE J2123−058<br>*John A. Tomsick, Dawn M. Gelino, Jules P. Halpern, & Philip Kaaret* | 933 |
| EFFECT OF DIFFERENTIAL ROTATION ON THE MAXIMUM MASS OF NEUTRON STARS: REALISTIC NUCLEAR EQUATIONS OF STATE<br>*Ian A. Morrison, Thomas W. Baumgarte, & Stuart L. Shapiro* | 941 |
| PROPERTIES AND INTERPRETATIONS OF GIANT MICROPULSES AND GIANT PULSES FROM PULSARS<br>*Iver H. Cairns* | 948 |
| *CHANDRA* OBSERVATIONS AND MONTE CARLO SIMULATIONS OF THE GRAIN-SCATTERED HALO OF THE BINARY X-RAY PULSAR 4U 1538−52<br>*George W. Clark* | 956 |

# CONTENTS


| | Page |
|---|---|
| SPREADING OF ACCRETED MATERIAL ON WHITE DWARFS<br>*Anthony L. Piro & Lars Bildsten* | 977 |
| *CHANDRA* OBSERVATION OF V426 OPHIUCHI: WEIGHING THE EVIDENCE FOR A MAGNETIC WHITE DWARF ©<br>*Lee Homer, Paula Szkody, John C. Raymond, Robert E. Fried, D. W. Hoard, S. L. Hawley, M. Wolfe, J. N. Tramposch, & K. T. Yirak* | 991 |
| THE PECULIAR PULSATIONS OF PY VULPECULAE<br>*Susan E. Thompson, J. C. Clemens, M. H. van Kerkwijk, M. Sean O'Brien, & D. Koester* | 1001 |
| DISCOVERY OF AN ULTRACOOL WHITE DWARF COMPANION<br>*J. Farihi* | 1013 |
| QUANTITATIVE STUDIES OF THE FAR-ULTRAVIOLET, ULTRAVIOLET, AND OPTICAL SPECTRA OF LATE O- AND EARLY B-TYPE SUPERGIANTS IN THE MAGELLANIC CLOUDS<br>*C. J. Evans, P. A. Crowther, A. W. Fullerton, & D. J. Hillier* | 1021 |
| LIMITS ON *I*-BAND MICROVARIABILITY OF THE GALACTIC BULGE MIRA VARIABLES<br>*P. R. Woźniak, K. E. McGowan, & W. T. Vestrand* | 1038 |
| THE SPECTROSCOPICALLY DETERMINED SUBSTELLAR MASS FUNCTION OF THE ORION NEBULA CLUSTER<br>*Catherine L. Slesnick, Lynne A. Hillenbrand, & John M. Carpenter* | 1045 |
| THE SUBSTELLAR POPULATION OF THE YOUNG CLUSTER $\lambda$ ORIONIS ©<br>*D. Barrado y Navascués, J. R. Stauffer, J. Bouvier, R. Jayawardhana, & Jean-Charles Cuillandre* | 1064 |
| NEW INFORMATION FROM RADIAL VELOCITY DATA SETS<br>*Robert A. Brown* | 1079 |
| DYNAMICAL PROPERTIES OF THE MULTIPLANET SYSTEM AROUND HD 169830<br>*Krzysztof Goździewski & Maciej Konacki* | 1093 |
| NUMERICAL EXAMINATION OF THE STABILITY OF AN EXACT TWO-DIMENSIONAL SOLUTION FOR FLUX PILE-UP MAGNETIC RECONNECTION<br>*Shigenobu Hirose, Yuri E. Litvinenko, Syuniti Tanuma, Kazunari Shibata, Masaaki Takahashi, Takayuki Taniyawa, Takahiro Sasaqui, Ayato Noro, Kazuhiro Uehara, Kunio Takahashi, Takashi Taniguchi, & Yuliya A. Terekhova* | 1107 |
| OUTFLOW STRUCTURE AND RECONNECTION RATE OF THE SELF-SIMILAR EVOLUTION MODEL OF FAST MAGNETIC RECONNECTION<br>*Shin-ya Nitta* | 1117 |
| TWIST PROPAGATION IN H$\alpha$ SURGES<br>*Patricia Jibben & Richard C. Canfield* | 1129 |
| ON A SURGE: PROPERTIES OF AN EMERGING FLUX REGION<br>*Yu Liu & Hiroki Kurokawa* | 1136 |
| ILCT: RECOVERING PHOTOSPHERIC VELOCITIES FROM MAGNETOGRAMS BY COMBINING THE INDUCTION EQUATION WITH LOCAL CORRELATION TRACKING ©<br>*B. T. Welsch, G. H. Fisher, W. P. Abbett, & S. Regnier* | 1148 |
| RING-DIAGRAM ANALYSIS OF THE STRUCTURE OF SOLAR ACTIVE REGIONS<br>*Sarbani Basu, H. M. Antia, & Richard S. Bogart* | 1157 |
| DO ANOMALOUS COSMIC RAYS MODIFY THE TERMINATION SHOCK?<br>*V. Florinski, G. P. Zank, J. R. Jokipii, E. C. Stone, & A. C. Cummings* | 1169 |
| *XMM-NEWTON* OBSERVATION OF SOLAR WIND CHARGE EXCHANGE EMISSION<br>*S. L. Snowden, M. R. Collier, & K. D. Kuntz* | 1182 |
| DETECTION OF ATOMIC CHLORINE IN IO'S ATMOSPHERE WITH THE *HUBBLE SPACE TELESCOPE* GHRS<br>*Lori M. Feaga, Melissa A. McGrath, Paul D. Feldman, & Darrell F. Strobel* | 1191 |
| *KEPLER* AND THE KUIPER BELT<br>*B. Scott Gaudi* | 1199 |
| *CHANDRA* ACIS SUBPIXEL EVENT REPOSITIONING: FURTHER REFINEMENTS AND COMPARISON BETWEEN BACKSIDE- AND FRONTSIDE-ILLUMINATED X-RAY CCDs ©<br>*Jingqiang Li, Joel H. Kastner, Gregory Y. Prigozhin, Norbert S. Schulz, Eric D. Feigelson, & Konstantin V. Getman* | 1204 |
| AN IMAGE RESTORATION TECHNIQUE WITH ERROR ESTIMATES<br>*David N. Esch, Alanna Connors, Margarita Karovska, & David A. van Dyk* | 1213 |
| DISSOCIATIVE RECOMBINATION OF $S^{18}O_2^+$: EVIDENCE FOR THREE-BODY BREAKUP<br>*W. D. Geppert, F. Hellberg, A. Ehlerding, J. Semaniak, F. Österdahl, M. Kaminska, V. Zhaunerchyk, A. Al-Khalili, M. af Ugglas, R. Thomas, A. Källberg, & M. Larsson* | 1228 |
| ERRATUM: "THE DEEP GROTH STRIP SURVEY. VII. THE METALLICITY OF FIELD GALAXIES AT $0.26 < z < 0.82$ AND THE EVOLUTION OF THE LUMINOSITY-METALLICITY RELATION" (ApJ, 599, 1006 [2003])<br>*Henry A. Kobulnicky, Christopher N. A. Willmer, Andrew C. Phillips, David C. Koo, S. M. Faber, Benjamin J. Weiner, Vicki L. Sarajedini, Luc Simard, & Nicole P. Vogt* | 1234 |
| INSTRUCTIONS TO AUTHORS | i |